

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1. (currently amended) A method for metal smelting comprising the steps of:

(A1) preliminarily reducing at least one mixture of raw materials in a prereduction furnace to attain an average metallization degree of from 5 to 55% for iron oxide and/or iron hydroxide, the mixture of raw materials being selected from the group consisting of

(a) a mixture of raw materials prepared by mixing at least a carbonaceous material and an iron oxide and/or an iron hydroxide,

(b) a mixture of raw materials prepared by mixing and granulating at least a carbonaceous material and an iron oxide and/or an iron hydroxide, and

(c) a mixture of raw materials prepared by mixing and molding at least a carbonaceous material and an iron oxide and/or an iron hydroxide; and

(B1) melting and finally reducing the mixture of raw materials, which is preliminarily reduced in the step (A1), by charging said mixture of raw materials to a ~~melting~~ smelting reduction furnace using the carbonaceous material as a reducing agent, and using combustion heat of the carbonaceous material and combustion heat of carbon monoxide generated in the ~~melting~~ smelting reduction furnace as a main heat source,

wherein the mixture of raw materials at a high temperature discharged from the prereduction furnace after being preliminarily reduced is introduced to a non-open type vessel or a pneumatic conveying unit that is operated by a non-oxidizing gas as a pneumatic conveying gas, and is transferred to the smelting reduction furnace using the non-open type vessel or the pneumatic conveying unit while keeping the mixture at a temperature of 600°C or greater, and then is charged to the smelting reduction furnace;

the percentage of post combustion of a gas generated in the smelting reduction furnace is 20% or more;

an additional carbonaceous material, other than the carbonaceous material contained in the mixture of raw materials, is charged to the smelting reduction furnace.

Claim 2. (canceled)

Claim 3. (canceled)

Claim 4. (canceled)

Claim 5. (canceled)

Claim 6. (canceled)

Claim 7. (canceled)

Claim 8. (withdrawn) The method for metal smelting of claim [[7]] 1, wherein the high temperature mixture of raw materials, which is preliminarily reduced in the step (A1) or the step (A2), the mixture of raw materials, which is preliminarily reduced in the step (A2), includes a mixture that contains the metal oxide and/or the metal hydroxide of (i) and/or (ii), is charged to the ~~melting~~ smelting reduction furnace at the same time that the carbonaceous material is charged thereto; and at least a part of each of the charged mixture of raw materials and the carbonaceous material falls down in the furnace to reach to a bath surface.

Claim 9. (canceled)

Claim 10. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein the mixture of raw materials is reduced in a reduction zone of the prereduction furnace, and an oxide layer is formed on a surface layer of particles of the mixture of raw materials.

Claim 11. (withdrawn) The method for metal smelting of claim 10, wherein a degree of oxidization of an intrafurnace atmosphere of a part of or total region of the reduction zone of the prereduction furnace is 30% or more.

Claim 12. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein a gas generated in the ~~melting~~ smelting reduction furnace is charged to the prereduction furnace as a combustion gas.

Claim 13. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein a gas, which is generated in the ~~melting~~ smelting reduction furnace and which becomes ~~to~~ lower than 300°C after being discharged from the ~~melting~~ smelting

reduction furnace, and/or an oxygen-containing gas being charged to the prereduction furnace are preheated by the sensible heat of a flue gas discharged from the prereduction furnace and/or sensible heat of a flue gas obtained by combusting a part of a gas generated in the ~~melting~~ smelting reduction furnace, then are charged to the prereduction furnace.

Claim 14. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein a generated gas, which is generated in the ~~melting~~ smelting reduction furnace and which becomes to lower than 300°C after being discharged from the ~~melting~~ smelting reduction furnace, and/or an oxygen-containing support gas being charged to the prereduction furnace are preheated by the steps of (i) and (ii) given below, then are charged to the prereduction furnace:

(i) preheating the generated gas and/or the oxygen-containing support gas by the sensible heat of a flue gas coming from the prereduction furnace to raise the temperature thereof to below 500°C, and

(ii) preheating the generated gas and/or the oxygen-containing support gas, which are preheated in the step (i) by the sensible heat of a flue gas prepared by combusting a part of the generated gas and/or other fuel to further increase the temperature thereof.

Claim 15. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein at least a part of an auxiliary raw material being charged to the ~~melting~~ smelting reduction furnace is charged to the prereduction furnace along with the mixture of raw materials.

Claim 16. (withdrawn) The method for metal smelting of claim 15, wherein at least a part of the auxiliary raw material being charged to the prereduction furnace is a non-burnt auxiliary raw material, and the auxiliary raw material is fired in the prereduction furnace.

Claim 17. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein the mixture of raw materials being

charged to the prereduction furnace contains dust recovered from a gas generated in the ~~melting~~ smelting reduction furnace.

Claim 18. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein the carbonaceous material is classified to individual particle ranges, and the carbonaceous material of fine particle ranges is used as a carbonaceous material to be added to the mixture of raw materials being charged to the prereduction furnace, while the carbonaceous material of coarse particle ranges is used as a carbonaceous material to be charged to the ~~melting~~ smelting reduction furnace.

Claim 19. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein at least a part of the mixture of raw materials being charged to the prereduction furnace or of individual raw materials before preparing the mixture of the raw materials is preliminarily dried using the sensible heat and/or the latent heat of a flue gas discharged from the prereduction furnace and/or of a gas generated in the ~~melting~~ smelting reduction furnace.

Claim 20. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein the prereduction furnace is a rotary hearth type prereduction furnace, and the preliminary reduction of the mixture of raw materials is conducted while forming a layer of powder and particle layer, which is not discharged from a raw material discharge opening, on a hearth of the rotary type furnace.

Claim 21. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein the prereduction furnace is a rotary hearth type prereduction furnace, and one or more of material selected from the group consisting of a mixture of raw materials, a metal oxide and/or a metal hydroxide, an auxiliary raw material being charged to the ~~melting~~ smelting reduction furnace, and a carbonaceous material, as a coolant onto a layer of raw materials immediately before being discharged from a raw material discharge opening, and treated raw materials are discharged from the furnace in a state that the coolant is mixed thereto using a raw material discharge unit located at the raw material discharge opening.

Claim 22. (withdrawn) The method for metal smelting of claim 21, wherein the weight ratio of an amount of Fe (A) in the coolant being charged onto the layer of raw materials to an amount of Fe (B) as an ingredient of the raw material layer, (A)/(B), is in a range of from 1/10 to 1/1.

Claim 23. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein a non-fired auxiliary raw material is fired under the contact with a high temperature flue gas discharged from the prereduction furnace, then is charged to the ~~melting~~ smelting reduction furnace.

Claim 24. (withdrawn) The method for metal smelting of claim 23, wherein air is preheated by a high temperature flue gas which was used for firing the non-fired auxiliary raw material, and the preheated air is supplied to the prereduction furnace.

Claim 25. (withdrawn) The method for metal smelting of claim 1 ~~or claim 2~~, wherein ~~the percentage of post combustion of~~

~~a gas generated in the melting furnace is 20% or more [[,]] and~~
the gas generated in the ~~melting~~ smelting reduction furnace is
charged to the prereduction furnace as a combustion gas.

Claim 26. (canceled)

Claim 27. (withdrawn) The method for metal smelting of
claim 1 ~~or claim 2~~, wherein at least a part of the mixture of raw
materials being charged to the prereduction furnace or at least a
part of individual raw materials before preparing the mixture of
raw materials is preheated by the sensible heat and/or the latent
heat of a flue gas coming from the prereduction furnace and/or a
gas generated in the ~~melting~~ smelting reduction furnace, ~~the~~
~~percentage of post combustion of the gas generated in the melting~~
~~furnace is 20% or more [[,]] and the gas generated in the melting~~
smelting reduction furnace is charged to the prereduction furnace
as a combustion gas.

Claims 28 to 69. (canceled)

Claim 70. (previously presented) The method for metal smelting according to claim 1, further comprising the steps of determining the average metallization degree based on production rate, energy consumption and energy balance in a process of manufacturing molten iron.

Claim 71. (previously presented) The method for metal smelting according to claim 1, wherein the average metallization degree is from 5 to 40%.

Claim 72. (previously presented) The method for metal smelting according to claim 71, wherein the average metallization degree is from 10 to 30%.